Saskatchewan Agriculture

Economics Branch

Farm Management

SWINE ECONOMICS

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Introduction

The following material is meant to provide information on the economics of producing hogs for farrow-finish, weanling and feeder operations. **The impact of government programs is of special concern to potential hog producers.** These programs can have a significant impact on the profitability of producing hogs.

The production costs shown are composed of two different types of costs - non cash costs and cash costs.

Non cash costs will continue even if production is discontinued. These include a depreciation (yearly allowance to recover original start up cost) and an investment cost (assets have a value which could be invested elsewhere and earn investment income).

Cash costs are defined as those costs which are "out-of-pocket" operating expenses which are incurred daily when in production. The following budgets have an owner's labour and management return assigned in the "non cash" section. This particular non-cash cost has not been viewed as part of debt servicing. It is assumed that the owner requires the return for his or her living expenses. If production is discontinued the cash cost part of the budget would be discontinued as well. However, the repayment of loans for buildings and equipment would continue.

In the long run, all costs (cash and non-cash) must be recovered for the business to be profitable.

Budget assumptions are made at the beginning of each section. The summary pages are backed up by "Detailed Calculations" to illustrate how the cost estimates were obtained. The total cost of buildings and equipment is documented in "Budgeting Information, Appendix III."

When interpreting these costs for an individual situation, adjustments will be required. Examine the assumptions made and adjust the assumptions for your situation. You may be able to interpret cash costs directly from this data, however the actual investment costs may vary from one farm to another. Your actual "non cash" costs will likely be somewhat different than the estimations made in this material.

The management level required in the actual production, scheduling of events, disease control, nutrition and breeding are rather demanding. It is of particular importance to examine the cashflow of the proposed swine operation in addition to the economics. The impact of reduced production or delayed start-up can cause severe cash flow shortages in the initial stages of operation. Cash flow shortages can have significant effects on future long term profitability of the venture.

Appendix I provides detailed information on the rations used in calculating feed costs. Appendix II deals with the current government programs which are in place to assist hog producers. The reader is cautioned to contact the Department of Agriculture concerning these and other programs. Appendix III provides information of buildings and equipment required and costs.

A. Economics of Swine Production

The economic information contained in this publication is based on recommended practice, assumed production levels and estimated costs. Where feasible data collected from actual hog producers was used to support the assumptions used in the calculations. You are encouraged to read the materials and use them to establish a budget for your own situation.

The financial summary table provides basic assumptions, profit/loss statement, break even price estimate and debt/equity analysis for an average unit. The analysis is based on a 100 sow farrow-finish and farrow weanling operation and a feeder operation. This size of farm unit would require some additional labor beyond what the owner/operator could supply. Although a hired labor cost is used this labor could be supplied by other family members. The labor allowance for operator and hired laborer reflect this labor situation.

Production levels are very important in establishing the economics of developing a swine operation. Management ability will dictate the level of production which will to a large degree dictate the profitability of the venture.

The profit and loss statement shows a profitable farrow finish unit when government incentive programs are considered. However, a 10% drop in production from assumed levels could wipe out the profit potential for this venture.

Feed costs were determined using average feed consumption figures at different stages of the production cycle. A standard ration is used in the calculation. Users should determine the feed stuffs they have available and consult a livestock specialist to determine rations required.

Investment in facilities and equipment are based on an estimate of the new cost of these assets. Investment requirements could vary substantially between individuals resulting in different levels of non cash cost estimates.

Profit and Loss Statement

The profit and loss statement shows the economic profit/loss for the 3 types of production with and without government assistance programs. Readers are cautioned that an estimate is made of the average market price and stabilized price support for these budgets. Users should determine the appropriate levels or prices at the time of budgeting. Similarly all types of government assistance programs are considered in the analysis. Programs may be altered over time and readers should review current programs before preparing their own budgets.

Once the profit/loss statement is complete an estimate of economic profit is known. A business must be profitable to exist, that is, the income produced must cover cash costs of production, a reasonable return for labor, a charge for depreciation and a return on investment. Profit is money which is available for growth and savings. This economic evaluation of profit assumes 100% equity (no debt).

Break Even Analysis

Break even analysis calculates the break even level required to cover costs for a particular production item. For example, number of market hogs or investment level per sow could be used as the break even production item. In the analysis we have selected price per market animal as the variable and determined what price is needed to cover all economic costs. This price level can then be evaluated against expected price levels to determine if that price can reasonably be obtained. The break even price in this case is determined based on an economic evaluation where no debt is considered. Break even analysis could also be determined using a debt and equity cost.

Debt Equity Analysis

Debt equity analysis is a different concept from economic profit. We know that over the long term economic profit must be realized for the business to be viable. However, over the short run a business can survive when there is no economic profit. Farmers simply use their interest on investment charge, depreciation and in some cases their labour return to keep the business operating. We can make an estimate of repayment capacity by using information from the profit loss statement. The analysis tool is called a debt equity analysis.

The analysis uses the interest on investment, depreciation charge and profit (or loss) as the amount of money available to make principal and interest payments on debt. We do not use any labor charge as the cost used for labor is at a level needed for living and therfore it is assumed that no extra income is available from this labor charge. By dividing the sum of these figures by an appropriate amortization factor (factor shows the payment needed to repay $1 of debt over a specific time period) we can determine the level of debt which could be supported and by subtraction from the investment the amount of equity needed to begin this hog operation.

It is important to understand that the "equity required" figure must be "no cost" investment to the business. The owner/operator cannot receive a return on his equity invested unless the profitability of the venture improves through

higher production, price or reduced cost. The debt/equity analysis provides no money to replace worn out equipment and therefore must be viewed as a short run decision making tool. In order for the business to remain viable it must make an economic profit even if the debt equity analysis shows the operation can carry some debt. We can use the financial summary information to illustrate this point.

The farrow-finish operation with no government programs shows an economic loss of $153 per sow or $15300 per year. If we add the depreciation, interest on investment and operating loss together we will see that the debt servicing amount is (156 + 170 + -153) $173 per sow or $17,300/year. Stated another way if we operated this farm for a year we could have $17,300 left over in our pocket at the end of the year (we are still assuming 100% equity). However, if we look at all costs (including opportunity cost on investment) we show an economic loss of $15,300. To take the analysis one step further we can determine how much equity (no cost investment) is needed for the operation to "break-even" in the short run. At 12% interest over a 15 year term the operation requires 75% equity or a $330,000 equity investment to break even in the short run. We calculated the 75% by using the 15 year 12% amortization factor of .1468 and dividing this into the debt servicing amount of $173 per sow. This shows a debt carrying capacity of $1100 per sow. The operation can only generage enough net revenue to repay loans of $1100 per sow. Hence $3300 must come from "no cost" equity. When we consider the cost reducing effect of the cash advance program and the 8% financing on fixed assets as well as income support under stabilization programs it substantially enhances the profitability of the venture. Now only $80,000 of equity is needed to begin the operation and the economic profit is positive. Under this scenario if the budget assumptions are valid the hog enterprise is profitable and could support a debt level of 82%. It must be remembered that if debt is at an 82% level the owner receives no return on equity nor is there any allowance for buildings and equipment replacement. Adding a depreciation charge and return to equity would reduce the debt carrying capacity of the unit.

Once complete the analysis provides an estimate of the profitability and repayment capacity of the venture. If the owner decides to proceed it is suggested that an ongoing assessment of economic profit and repayment capacity be established to assess the progess of the business. Consult your local Regional Farm Managment Specialist who can assist you in developing your management plans.

Financial Summary

I. 100% Equity

a) Assumptions:	Farrow-Finish	Farrow-Feeder	Feeder Feeder
Size of Operation (sows)	100	100	-
Pigs Born/Litter (litters/yr)	9(2)	9(2)	-
Death Loss (%)	6.3	4.3	2.0
Culling Rate - Sows (%)	30	30	-
Boars (%)	40	40	-
Feeding Period (days)	182	63	119
Market Hogs (weanlings) Sold	1650	1686	1650
Guilts Retained	37	37	-
Hired Labor Hours	2000	1000	800
Investment	$4405/sow	$175/wn	$110/hog

b) Profit/Loss Statement	No Prgm /sow	With Prgm /sow	No Prgm /wn	With Prgm /wn	No Prgm /hog	With Prgm /hog
Income:						
Market Hogs (170lbs)/Weanling (50lbs)	1963	2194	52	52	119	132
Sows	37	37	2	2	-	-
Boars	2	-	-	-	-	-
Total Income	2002	2231	54	54	119	132
Expenses:						
Feed	1149	1149	22	22	45	45
Purchase Feeders	-	-	-	-	53	53
Boars	10	10	1	1	-	-
Hired Labour (at $7/hr)	140	140	4	4	3	3
Buildings and Equipment Repair & Maintenance (4%)	139	139	6	6	5	5
Utilities and Insurance	128	128	5	5	3	3
Veterinary and Medicine	54	54	1	1	2	2
Marketing and Transportation	63	63	-	-	4	4
Interest on Cash Costs	46	33	-	-1	2	1
Total Cash	1729	1716	39	38	117	116
Owners Labor and Management	100	100	5	5	4	4
Depreciation	156	156	6	6	5	5
Interest on Investment	170	170	7	7	4	4
Total Non-Cash	426	426	18	18	13	13
Total Cost	2155	2142	57	56	130	129
Profit/Loss	(153)	89	(3)	(2)	(11)	3
Break Even Cost (/cwt)	.75	.75	.53	.53	.76	.76

II. Debt/Equity Analysis

Equity Requirements (%)*	73%	18%	60%	45%	107%**	29%

* Formula: $\frac{\text{(Interest on Investment + Depreciation + Profit (Loss))}}{\text{Amortization Factor}}$

* Based on $53/weanling purchase price

B. COST OF PRODUCTION ESTIMATES

I. Farrow-Finish Production Costs

Assumptions:

100 sows - 2 litters/year at 9 = 18 x 100	1800
Death Loss - 6.3% (1800) = 113	1687
Retain 37 Gilts	1650

Feeding Period - 182 days
Market 1650 hogs at 170 lbs dressed
Market 30 cull sows at 350 lbs live
Market 2 cull boars at 450 lbs live
5 boars required for enterprise

Cash Costs	Total Enterprise	Cost Per Sow	Cost Per Market Hog
1. Feed	114,944	1,149	68
2. Boars - 2 at $500	1,000	10	1
3. Hired Labor - 2000 hrs at $7	14,000	140	8
4. Buildings, Equipment, Machinery Maintenance and Repair 347,250 at 4%	13,890	139	8
5. Utilities and Insurance	12,799	128	8
6. Veterinary and Medicine	5,448	54	3
7. Marketing and transportation costs	6,326	63	4
8. Interest on cash costs	4,631	46	3
Total Cash Costs	173,038	1,729	103
Non Cash Costs			
9. Owners Labor/management	10,000	100	8
10. Depreciation (Bldgs, Equip)	15,626	156	9
11. Interest on Investment	16,969	170	10
Total Non Cash Costs	42,595	426	25
Total Cost	215,633	2,155	128

Total Income	Total Enterprise	Total Income Per Sow	Total Income Per Mkt Hog
1. 1650 mkt hogs at 170 lbs at $70/cwt	196,350	1,963	119
2. 30 sows at 250 lbs at $50/cwt dressed	3,750	37	2
3. 2 boars at 300 lbs at $30/cwt dressed	180	2	-
Total Income	200,280	2002	121
Profit/Loss	(15,353)	(153)	(7)

* Break Even on Total Cost: .75/cwt
* Assuming an opportunity cost of 11% for operating funds, a 7% return on investment and a 20 year depreciation schedule.

A. DETAILED COST CALCULATIONS 100 SOW FARROW TO FINISH ENTERPRISE

1. Feed Requirements: Rations and Costs - Appendix I

a) Sow Gestation - 15% sow Ration - Home prepared
309 days at 5.17 lbs = .72 tonnes/sow at $155/tonne $112

b) Sow Lactation - 15% sow Ration
56 days at 12 1/2 lbs = .32 tonnes/sow at $155/tonne 49
$161
100 sows at 161 $16,100

c) Boar Ration - 12 1/2% - Commercial Feed
365 days at 5 1/2 lbs /day =
.91 tonnes/boar at $220/tonne
5 boars at $200 $1,000

d) Creep Feed Ration - 18% - Commercial Feed
Creep feed is fed to the weanlings from 0 to 22 lbs (4 weeks). Feed consumed is 11 lbs/pig
Average Number of Pigs on Feed
(at this point death loss is assumed at 4.3%)
$\frac{1800 + 1723}{2}$ = 1762 pigs
1762 pigs at 11 lbs x $375/tonne $3,296

e) Starter Ration - 18%
Starter ration is fed from 4 weeks to 9 weeks or from 22 lbs to 50 lbs of weight. Feed conversion is 2.25:1 or 63 lbs of feed per pig during the period.
63 lbs/pig at $338/tonne = $9.63
1762 pigs at 9.63 = $16,968

	Per Sow	Per Weanling
Total Feed Cost = $37,364	$374	$21

f) Grower and Finishing Ration - 16% - Home Prepared

Grower and finisher ration is fed from 9 weeks to 26 weeks or until the pig reaches full market weight of 220 lbs live (or 170 dressed). Feed conversion is 3.6:1 or 612 lbs/pig at $162/tonne = $45

$\frac{1762 + 1687}{2}$ = 1724 at $45 $77,580

Total Feed Cost - Farrow to Finish
37,364 + 77,580 = $114,944

2. Boar Capacity

Age	Use up to
10-12 months	25 times per month
12 months and over	40 times per month

Replace two boars per year

3. Labor Requirements

100 sow farrow - finish - 1.5 man units
1650 finishing operation - .7 man units
100 sow weanling operation - .9 man units
Assume 2000 hours per man year

4. Buildings, Equipment, Machinery

See Appendix 1V

5. Utilities and Insurance

Insurance - Buildings/equipment/machinery .80/$100
.80 x 3472 $2,778

Insurance - Livestock .45/$100

Livestock Investment		
100 sows at $250	25,000	
5 boars at $500	2,500	
1650 feeders ÷ 3 x $120/finished hog	66,000	
	93,500	
.45 x 935		$ 421
Total Insurance		$ 3,199
Utilities Assume $800/mo		$ 9,600
		$12,799

6. Veterinary and Medicine

Assume a normal herd health program
Medications, Vaccinations - $20/sow and litters

Cost per weanling	1.11
Cost per hog in finishing operation	2.00
Total Costs	3.11
100 sows at 20.00	2,000
1724 feeders at 2.00	3,448
Total Veterinary and Medicine	$5,448

7. Marketing and Transportation Costs

Marketing Levy 1 1/4% of market value
Transportation (.92 - 1.74) per cwt. dressed
Marketing 1650 + 30 + 2 = 1682 x $120
x 1 1/4% = 2523
Transportation 1682 x 170 lbs at 1.33 ave = 3803
Total Cost $6326
Dressing % - 78%

8. Interest on Cash Costs

Items #1 - 7 = 168,407
1 cycle every six months
Investment per cycle = 84,204
$\frac{84,204}{2}$ x 11% = $4,631

9. Owners Labor and Management

1000 hours at $10/hour = $10,000

10. Depreciation Buildings/Equipment

$\frac{347,250 - 34,725}{20 \text{ years}}$ = $15,626

11. Interest on Investment

Livestock	93,500	From Item #5
Buildings/Equipment	347,250	
	440,750	

$\frac{440,750 + 44,075}{2}$ x .07 = $16,969

II. FARROW-FEEDER PRODUCTION COSTS

Assumptions:

100 sows - 2 litters/year at 9 = 18 x 100	1800
Death Loss - 4.3% (1800) = 77	1723
Retain 37 Gilts	1686

Feeding Period - 0 to 9 weeks
Market 1686 hogs at 50 lbs live
Market 30 cull sows at 350 lbs live
Market 2 cull boars at 450 lbs live
5 boars required for enterprise

Total Cash Costs	Total Enterprise	Cost Per Sow	Cost Per Feeder Hog
1. Feed	37,364	374	22
2. Boars - 2 at $500	1,000	10	1
3. Hired Labor - 1000 hrs at $7	7,000	70	4
4. Buildings Equipment, Machinery Maintenance and Repair 249,000 at 4%	9,960	100	6
5. Utilities and Insurance	8,196	82	5
6. Veterinary and Medicine	2,000	20	1
7. Marketing and transportation costs	91	1	-
8. Interest on cash costs	723	7	-
Total Cash Costs	66,334	664	39
Non Cash Costs			
9. Owners Labor/management	8,000	80	5
10. Depreciation (Bldgs, Equip)	11,205	112	6
11. Interest on Investment	11,335	113	7
Total Non Cash Costs	30,540	305	18
Total Cost	$96,874	$969	$57

Total Total Income	Total Enterprise	Total Per Sow	Total Per Feeder Hog
1. 1686 feeder hogs at 50 lbs at $52 ea	87,672	877	52
2. 30 sows at 250 lbs at $50.cwt dressed	3,750	37	2
3. 2 boars at 300 lbs at $30/cwt dressed	180	2	-
Total Income	$91,602	$916	$54
Profit/Loss	(5,272)	(53)	(3)

* Break Even: $53 each
* Assuming an opportunity cost of 11% for operating funds, a 7% return on investment and a 20 year depreciation schedule

A. DETAILED COST CALCULATIONS
100 SOW FARROW TO FEEDER (WEANLING) ENTERPRISE

1. Feed Requirements: Rations and Costs - Appendix I

a) Sow Gestations - 15% sow Ration - Home Prepared
309 days at 5.17 lbs = .72t/sow at $155/tonne 112

b) Sow Lactation - 15% sow Ration
56 days at 12 1/2 lbs = .32t/sow lbs at $155/tonne = 49
$161
100 sows at 161 $16,100

c) Boar Ration - 12 1/2% - Commercial Feed
365 days at 5 1/2 lbs /day = .91t/sow at $220/tonne
5 boars at $200 1,000

d) Creep Feed Ration - 18% - Commercial Feed
Creep feed is fed to the weanling from 0 to 22 lbs (4 weeks). Feed consumed is 11 lbs/pig.
Average Number of Pigs on Feed
(at this point death loss is assumed at 4.3%)
$\frac{1800 + 1723}{2}$ = 1762 pigs
1762 pigs at 11 lbs x $375/tonne $3,296

e) Starter Ration - 18% - 35 days 5 weeks
Starter Ration is fed from 4 weeks to 9 weeks or from 22 lbs to 50 lbs of weight. Feed conversion is 2:25.1 or 63 lbs of feed per pig during the period
63 lbs/pig at $338/T = 9.63
100 sows - 1762 pigs at 9.63 = $16,968

	Per Sow	Per Weanling
Total Feed Cost = 37,364	$374	$22

2. Boar Capacity

Age	Use up to
10-12 months	25 times per month
12 months and over	40 times per month

Replace two boars per year

3. Labor Requirements

100 sow farrow - finish - 1.5 man units
1650 finishing operation - .7 man units
100 sow weanling operation - .9 man units
Assume 2000 hours per man year

4. Buildings Equipment Machinery

See Appendix IV

5. Utilities and Insurance

Insurance - Buildings/equipment/machinery
.80/$100
.80 x 2490 = $1,992

Insurance - Livestock .45/$100

Livestock Investment		
100 sows at $250	25,000	
5 boars at $500	2,500	
1723 feeders ÷ 5 x $52/weanling hog	17,919	
	45,419	
.45 x 454 = 204		
Total Insurance		2,196
Utilities Assume $500/mo		6,000
		$8,196

6. Veterinary and Medicine

Assume a normal herd health program
Medications, Vaccinations - $20/sow and litters

7. Marketing and Transportation Costs

Feeders - Usually sold F.O.B. from plant
Cull sows/boars - 32 at $120 at 1 1/4%
$48 + (1.33 x 32) transportation = 48 + 43 91.00

8. Interest on Cash Costs

Items #1 - 7 = 65,611
1 cycle each nine weeks
5 cycles per year
Investment per cycle $\frac{13,122}{2}$ x 11% 723

9. Owners Labor and Management

800 hours at $10/hour = 8,000

10. Depreciation Buildings/Equipment

$\frac{249,000 - 24,900}{20 \text{ years}}$ = 11,205

11. Interest on Investment

Livestock	45,419	From Item #5
Buildings/Equipment	249,000	
	294,419	

$\frac{294,419 + 29,442}{2}$ x .07 = 11,335

III. FEEDER HOG PRODUCTION COSTS

Assumptions:

Purchase 1686 50lb Feeders	1686
Death Loss - 2% (1686) = 36	1650
Barn to House: 600 hogs	
Feeding Period - 17 weeks - 119 days	
Market 1650 hogs at 170 lbs dressed	

Cash Costs	Total Enterprise	Cost Per Market Hog
1. Feed	75,060	45
2. Purchase 1686 feeders at $52 each	87,672	53
3. Hired Labor - 800 hrs at $7	5,600	3
4. Buildings Equipment, Machinery Maintenance and Repair 184,750 at 4%	7,390	5
5. Utilities and Insurance	4,175	3
6. Veterinary and Medicine	3,372	2
7. Marketing and transportation costs	6,205	4
8. Interest on cash costs	3,474	2
Total Cash Costs	$192,948	$117

Non Cash Costs

9. Owners Labor/management	6,000	4
10. Depreciation (Bldgs, Equip)	8,314	5
11. Interest on Investment	7,113	4
Total Non Cash Costs	21,427	13
Total Cost	$214,375	$130

Total Income

1650 market hogs at 170 lbs x $70/cwt	196,350	119
Profit/Loss	(18,025)	(11)

* Break Even on Total Cost: .76/cwt
* Assuming an opportunity cost of 11% for operating funds, a 7% return on investment and a 20 year depreciation schedule.

A. DETAILED COST CALCULATIONS FEEDER ENTERPRISE

1. Feed Requirements: Rations and Costs - Appendix 1

a) Grower and Finishing Ration - 16% - Home Prepared
Grower and finisher rations is fed from 9 weeks to 26 weeks or until the pig reaches full market weight of 220 lbs live or 170 lbs dressed. Feed conversion is 3.6-:1 or 612 lbs/pig during the feeding period.
170 lbs x 3.60 = 612 lbs at $162/tonne = 45.00
$\frac{1686 + 1650}{2}$ = 1668 pigs at 45.00 75,060

2. Purchase 1686 feeders at $52 each delivered

3. Labor Requirements

100 sow farrow - finish - 1.5 man units
1650 finishing operation - .7 man units
100 sow weanling operation - .9 man units
Assume 2000 hours per man year

4. Buildings Equipment Machinery

See Appendix IV

5. Utilities and Insurance

Insurance - Buildings/equipment/machinery .80/$100
.80 x 1847 = $1,478

Insurance - Livestock .45/$100
Livestock Investment
1650 feeders ÷ 3 x $120/finished hog = 66,000
.45 x 660 = 297

Total Insurance	1,775
Utilities Assume $200/mo	2,400
	4,175

6. Veterinary and Medicine

Cost per hog in finishing operation 2.00

7. Marketing and Transportation Costs

Marketing Levy 1 1/4% of market value
Transportation (.92 - 1.74) per cwt. dressed

Marketing 1650 x $120 x 1 1/4%	2475
Transportation 1650 x 170 lbs at 1.33 ave	3730
Total Cost	6205

Dressing % - 78%

8. Interest on Cash Costs

Items #1 - 7 = 189,474
1 cycle every 17 weeks
Investment per cycle = 66,827
$\frac{63,158 \text{ x } 11\%}{2}$ = 3,474

9. Owners Labor and Management

600 hours at $10/hour = 6,000

10. Depreciation Buildings/Equipment

$\frac{184,750 - 18,475}{20 \text{ years}}$ = 8,314

11. Interest on Investment

Livestock Included in Item #8 - Interest calculated as cash cost on purchase of feeders
Buildings/Equipment 184,750

$\frac{184,750 + 18,475}{2}$ x .07 = 7,113

Appendix I

Rations: Components and Costs

i) Gestation and Lactating sow Ration - 15%

	Ration	Cost Per 100 lbs
Barley (11%) at 4.5¢/lb	66 lbs	2.97
Wheat (12.5%) at 5.5¢/lb	20 lbs	1.10
Sow Supplement (40%) at .17¢/lb	14 lbs	2.38
	100 lbs	6.45

Cost per tonne 6.45 x 22.05 = $142.22
Home Preparation - 8% less efficient
Real cost per tonne = $154.58

ii) Grower and Finisher - 16%

	Ration	Cost Per 100 lbs
Barley (11%) at 4.5¢/lb	59 lbs	2.65
Wheat (12.5%) at 5.5¢/lb	25 lbs	1.37
Hog supplement (40%) at 17¢/lb	16 lbs	2.72
	100 lbs	6.74

Cost per tonne - $6.74 x 22.05 = 148.62
Home Preparation - 8% less efficient
Real cost per tonne = $161.54

Boar, creep feed and starter ration are commercially prepared.

Note: The analyses assumes that sow ration and grower/finisher rations are home prepared. It is assumed that home prepared feed will require 8% more feed per hog due to waste. The costs are therefore increased by 8%.

Appendix II

Swine Incentive Programs
(Detailed Calculations)

1. **Stabilization Program/12% vs 8% financing**

1985 Average Support level	$80.33/cwt.dr.
1985 Average Market Price	65.55/cwt.dr.
Average Payout	$14.78/cwt.dr.

a) Farrow to Finish

1650 market hogs at 170 lbs at 65.55 less 4% levy	176,513
Stabilization payment 280,500 lbs dr. at $14.78	41,458
Cull sows and boars	3,930
Total Income	221,901
Total Cost	215,633
Profit	$6,268

Debt Servicing Capacity

Depreciation	15,626
Interest on investment	16,969
Profit	6,268
Maximum Debt Servicing Capacity	$38,863

Total Investment - $440,750
15 years with one annual payment at 12% — 146.82/thousand
15 years with one annual payment at 8% — 116.83/thousand

12% 38,863 / 146.82 = 264,690 — Equity Required 40%

8% 38,863 / 116.83 = 332,640 — Equity Required 25%

b) Farrow/weanling
Sharp Program does not apply

Current return at $52 each Profit/Loss	(5,272)
Debt Servicing Capacity:	
Depreciation	11,205
Interest on investment	11,335
Profit/Loss	(5,272)
Maximum Capacity	17,268

Total Investment 294,419

12% 17,268 / 146.82 = 117,610 — Equity Required 60%

8% 17,268 / 116.83 = 147,800 — Equity Required 50%

c) Finishing Enterprise

1650 market hogs at 170 lbs at 65.55 less 4% levy	176,513
SHARP payment 280,500 lbs dressed at 14.78	41,458
Total Income	217,971
Total Cost	214,375
Profit	3,596
Debt Servicing Capacity	
Depreciation	8,314
Interest on Investment	7,113
Profit	3,596
Maximum capacity	19,023

Total Investment $250,750
12%=19,023/146.82=$129,560 — Equity Required 48%
8%=19,023/116.83=$162,820 — Equity Required 35%

2. $25 Cash Advance - Interest Free

a) 100 Sow Farrow to Finish

Number of Hogs at one time

Feeder Barn	600
Sows	90
Gilts	12
Boars	6
Weanlings	600
Total Head	1,308

Total advance - 1,308 at $25 $32,700

Reduce Interest on cash costs - Item #8 as follows:

$\frac{84,204}{2}$ = 42,102 - 32,700 = 9,402 x 11% = $1,304

Difference (4,631 - 1,034) = $3,597
Increase net 3,597
Reduce breakeven by $3597 -: 280,500 lbs = $.0128/cwt.dressed
Increase debt servicing capacity
12% - $24,490 Equity Required 34%
8% - $30,780 Equity Required 18%

b) 100 Sow Farrow to Feeder (Weanling)

Number of Hogs at one time

Sows	90
Gilts	12
Boars	6
Weanlings	600
Total Head	708

Total Advance - 708 head at $25 17,700

Reduce Item #8 to 0

$\frac{13,122}{2}$ = 6,561 - 17,700 = -11,139

Reduce item #11 to

$\frac{294,419 + 29,442}{2}$ = 161,931 - 11,139

= 150,792 x .07 10,555

Increased Net Income:
723 + (11,335 - 10,555) 1,503
Reduce Breakeven by $1 per weanling
Increase debt servicing capacity
12% - 10,237 Equity Required 57%
8% - 12,864 Equity Required 45%

c) Finishing Enterprise

Number of hogs at one time

Feeders	600
Total Head	600

Total Advance - 600 at $25 $15,000
Reduce Item #8

$\frac{63,158}{2}$ = 31,579 - 15,000 = 16,579 x 11% = 1,824

Increase Net $1,650
Reduce Breakeven by $1 per Finished Hog
Increase Debt Servicing Capacity
12% - 11,238 Equity Required 44%
8% - 14,120 Equity Required 29%

I. Summary of Equity Requirements

Type of Enterprise	Equity Requirements				
	No Programs 12% Interest	Stabilization + 12% Interest	Stabilization + 12 Interest + Cash Advance	Stabilization + 8% Interest	Stabilization + 8% Interest + Cash Advance
Farrow/Finish Selling Price	73% $70/cwt	40% $78/cwt	34% $78/cwt	25% $78/cwt	18% $78/cwt
Farrow/Weanling Market Price	60% $52 ea	60% $52 ea	57% $52 ea	50% $52 ea	45% $52 ea
Feeder (weanling purchased) $52 ea Market Price	107% $70/cwt	48% $78/cwt	44% $78/cwt	35% $78/cwt	29% $78/cwt

Appendix III Budgeting Information

SWINE HOUSING - SIZING AND MANAGEMENT

The trend in swine production is toward totally enclosed, well-insulated and mechanically ventilated buildings. Pigs have specific temperature and space requirements depending on their age. For that reason, buildings are usually partitioned into rooms where each phase of production can be provided with the proper environment.

With larger operations it is feasible to split the barn into several distinct areas that best suit the requirements of the pigs housed in them. These areas are:

1. farrowing
2. weanling (nursery)
3. grower-finisher
4. breeding-gestation
5. service area

For smaller operations, some of these functions may have to be combined. In some larger operations, several of these areas may be further subdivided. There may be multiple farrowing and nursery rooms, separate areas for growers and finishers, or separate rooms for breeding and gestation.

For a farrow-to-finish operation, these components must all be combined into a single production system with proper provisions for handling animals, feed, ventilation, manure and people.

The sizing of hog production facilities is based on a number of assumptions that must be made concerning the performance of the animals in the barn. These basically involve the breeding performance of the sow herd and the growth performance of the animals from farrowing to finishing.

Hog barns are often commonly referred to as being for a specific number of sows. However, the production from a given number of sows can vary greatly, depending on the number of litters per year and the pigs weaned per litter.

Pigs Produced Per Year By 100 Active Breeding Sows

Litters/Year		1.6	1.8	2.0	2.2	2.4	2.6
Pigs Weaned Per Litter	6	960	1080	1200	1320	1440	1560
	7	1120	1260	1400	1540	1680	1820
	8	1280	1440	1600	1760	1920	2080
	9	1440	1620	1800	1980	2160	2340
	10	1600	1800	2000	2200	2400	2600

It is preferable to start with a given number of farrowing crates or desired farrowings per week and then size the sow housing and weanling to feeder barns based on the expected production from these crates or farrowings per week and the estimated growth performance of the animals weaned.

The sizing requirements for the breeding-gestation and weanling to feeder areas will likely tend to change over the life of a hog operation. As breeding performance improves, it should be possible to reduce the size of the sow herd to produce a given number of farrowings per week and at the same time, these farrowings should result in more pigs weaned per year. This will tend to overcrowd the weanling to finisher end of the barn unless growth performance is also improving to reduce the days to market so that the cycles per year in the grower-finisher area can be increased.

BUILDING LAYOUTS AND OPERATION

The example barn shown here outlines one set of possible component buildings for a nominal 100-sow farrow-to-finish operation.

Farrowing-Weanling (CPS M-3303)

The farrowing-weanling unit is a modified version of Canada Plan Service plan M-3303. This unit is intended to be run as an all-in, all-out farrowing and weanling operation. Each of the three farrowing room is assumed to be on a six-week cycle made up of one week for prefarrowing, four weeks for nursing, and one week for weaning and cleanup. Each farrowing room will require eight bred sows to be available every other week or four bred sows every week. The nursery rooms would also operate on a six-week cycle.

If the crate cycle time is reduced, the farrowing room will be capable of handling more sows than indicated. However, this will upset the uniform six-week cycle which means that tasks cannot be scheduled for the same day every week. It will also require adjustments in the sizing of the breeding-gestation unit and the feeder barn. Similarly, increasing the pigs weaned per litter and/or the number of litters per year, or changing the weeks to market age will alter barn sizing requirements.

The sow handling capacity of the farrowing and nursery barn can be doubled by adding two additional farrowing rooms and two or three additional nursery rooms and switching to a five-week cycle with a younger weaning age.

An alternate building layout would be to have a central hallway with farrowing rooms on one side of the hall and nursery rooms on the other side, or farrowing rooms at one end of the building and nursery rooms at the other. These configurations would have two rows of farrowing crates or nursery pens per room rather than the single row illustrated.

Breeding-Gestation (CPS M-3236)

The breeding-gestation unit is suitable for the nominal 100-sow herd. Dry sows are confined either in group pens or in individual pen stalls for much of the gestation period (16 weeks). Pen stalls prevent fighting and competition for feed during the breeding-gestation period. For improved breeding performance, inter-mix boar pens with sow pens to promote sexual stimulation by sight, hearing, smell and touch.

The full housing capacity is 68 dry sows in individual pen stalls, 32 gilts or sows in group pens, and five boars. This makes a total capacity of 105 breeding pigs, not counting the 16 to 24 sows in the farrowing rooms at any given time. The building length (and the corresponding numbers of group pens and pen stalls) can be adjusted to accommodate more or fewer breeding pigs. For larger herds, a wider building with four rows of pens and stalls and separate breeding and gestation rooms can be used. (CPS M-3241)

Grower-Finisher (CPS M-3428)

The grower-finisher barn is a standard configuration with a center feed alley and partially slotted pens on either side. Another common configuration uses a center manure pit with alleys around the outside of the barn. This requires a larger barn because of the extra alley space, but it does reduce the problem of protecting the outside walls from the pigs.

Grower-finisher barn sizing is very sensitive to the age and weight of the pigs coming into the barn and the amount of time they take to reach market age. Overcrowding will tend to increase days to market and thus tends to become worse. Hot weather also tends to have a detrimental effect on growth performance. It is preferable to sell some pigs off as weanlings rather than crowding the feeder barn.

Service and Utility Areas

In addition to these three major components, there will be one or more service and utility areas within or near the barn. These could include the following:

1. office and bathroom
2. pig handling and weighing
3. feed processing and storage
4. utility areas (electrical, water, manure transfer, parts storage)
5. preheat rooms or hallways

Particular attention should be paid to feed and manure handling and storage. Feed is a major input cost to a hog operation. Manure is a high volume output that should be handled to maximize fertilizer potential and minimize pollution potential.

Information in the form of plans, publications and handi-facts is available from Agricultural Engineering Section, Extension Service, on a variety of topics relating to hog barn design and operation.

The plans referred to are produced by the Canada Plan Service, a co-operative venture of the federal and provincial deparments of agriculture. In addition to these, a number of plans have been produced by Saskatchewan Agriculture for specific Saskatchewan requirements.

Each plan is described in a leaflet which provides management information and some construction

details. In some cases, the leaflet contains enough information so that a large scale plan is not required. Leaflets and publications may be ordered by mail. It is recommended that leaflets and plans be obtained directly from the farmstead engineer serving your area. Once contact is established, the farmstead engineer is in a position to advise of plan modifications, if required, to make it more suitable for your particular project and conditions. He can also advise you on pollution control requirements.

For further information, contact your farmstead engineer.

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Swine Housing and Equipment Costs
Farrow-to-Finish 4 litters Per Week

Description	Cost
1. Breeding Gestation Unit CPS Plan No. M-3236	
- 64 sow stalls, 8 sow pens, 5 boar/breeding pens	
- Manure: 2'*2' deep * 6' wide stop and flow gutter	
- Cross ventiliation through centre air inlet from attic	
COSTS	$
36'*81' insultated shell including site pre.	32000
Concrete floor with gutters	7250
Slats	4250
64 sow stalls, with concrete feed trough	7250
Pen partitioning, posts, brackets	4250
Exhausts fans with hoods and controls	2500
Centre air inlet	1500
Plumbing, 13 nipple drinkers	1000
Wiring	2500
Total Cost	62500
Cost per sow	625
Cost per square foot	21.43
2. Farrowing/Weanling Unit CPS Plan M-3303	
- 3 farrowing rooms with 8 crates per room designed for 4 farrowings per week, weaning at 4 weeks of age	
- 3 weanling rooms with 8 pens each for pigs from 4 to 9 weeks of age	
- Both farrowing and weanling rooms can operate all in/all out	
- Manure: 2' deep stop and flow gutters	
Costs	
46'*70' insulated shell including sit prepartion	44000
Concrete floor with 6 gutters and drain tiles	12000
6 interior wall partitions with 9 doors	6000
Slatted floors for farrowing and weanling pens	7000
Farrowing crates, pens, creep feeders, heat lamps	8000
Weanling pens, feeders	8000
Exhaust fans, hoods, controls, room and hall heaters	9000
Wiring	3500
Plumbing	2500
Total Cost	100000
Cost per sow	1000
Cost per square foot	31.06
Note: One room farrowing/one room weanling would result in a savings of $11,500	
Saving on interior partitions and floor space	**8000**
Savings on ventilation and heating systems	**3500**
Total Savings	**11500**

Description	Cost
3. Finishing Unit CPS Plan No. 3428	
- Barn to house 600 hogs in 16 - 6'*16' grower pens, 16 - 8'*16' finishing pens, with 7-5'*12' sick or tail ender pens	
- Partially slatted floors, with 2'*6' stop and flow gutters	
- Cross ventilation through centre air inlet from attic	
Costs	
128'*36' insulated shell including site preparation	48500
Concrete floors with gutters	12000
Slats	6500
Pen partitions, gates, posts	9750
21 self feeders	5000
147' centre air inlet	3000
Exhaust fans, hoods, and controls	7000
Plumbing including 69 nipple drinkers	3500
Wiring	3000
Total Cost	98250
Cost per sow	983
Cost per square foot	21.32
Cost per pig housed	164
Note: The 21 self feeders would be filled manually with feed carts	
4. Miscellaneous Items	
Feed: 15,000 bushel storage at $1.00/bushel	15,000
Feed room 36'*16' office	14500
Electric mixer-grinder	22500
2-10 ton bins, augers, feed carts	8500
Manure: Earthen Manure storage 90,000 cu ft	7000
Liquid manure pump, 3000 gallon spreader	11000
Sump, transfer pump, wiring	1750
Water: Well, 150' deep with submersible pump	4250
Hydro: Service from road to barn	2000
Total Cost	86500
Cost per sow	865

5. **Summary of Investment Costs**

a) Buildings and Equipment

	Total	Cost per sow	Cost per Market Hog
Breeding/Gestation	62,500	625	38
Farrowing/Weaning	100,000	1000	61
Finishing	98,250	983	59
Miscellaneous	86,500	865	52
	347,250	3,473	210

b) Livestock

Total	Sows	Boars	Weanlings	Feeders
Farrow/Finish 93,500	25,000	2,500		66,000
Farrow/Weanling 45,419	25,000	2,500	17,919	
Finishing 66,000				66,000

c) Total Investment: Buildings, Equipment and Livestock

Farrow/Finish - 440,750 or $4,407 per sow or $267/mkt hog
Farrow/Weanling - 294,419 or $2,944 per sow or 175/mkt hog
Finishing - 250,750 or $152 per market hog

Market Prices - Hogs - 1982 - 1985
(all prices in $cwt, dressed, index 100)
Basis Saskatoon

QTR	Market Price	Support Level (SHARP)	Cost (%) (SHARP)
85-4	68.15	78.48	4.50
85-3	64.42	80.96	4.00
85.2	60.49	81.21	4.00
85-1	69.16	80.68	3.50
Ave	65.55	80.33	
84-4	68.54	79.64	3.50
84-3	74.77	79.36	3.50
84-2	69.40	78.02	3.50
84-1	64.58	76.01	3.50
Ave	69.32	78.26	
83-4	59.53	74.07	3.50
83-3	67.53	71.75	3.50
83-2	67.89	73.85	3.50
83-1	74.43	79.59	4.00
Ave	67.45	74.82	
82-4	80.12	77.02	4.50
82-3	92.49	79.31	4.50
82-2	85.10	79.40	3.00
82-1	68.17	78.49	3.00
Ave	81.47	78.56	